

CLAIMS

1. A method for proliferating human hepatocytes, which comprises transplanting human hepatocytes into a liver of an immunodeficient
5 hepatopathy mouse, and then feeding the mouse transplanted with the human hepatocytes under such a condition as being protected from the attack by human complement produced by the human hepatocytes thereby proliferating the transplanted human hepatocytes in the mouse liver.
- 10 2. The method for proliferating the human hepatocytes of claim 1, wherein the condition of being protected from the attack by human complement is at least one of the following (a) and (b):
(a) the mouse transplanted with the human hepatocytes is administered at least once with a complement inhibitor;
15 (b) a progeniture mouse obtained by mating between an immunodeficient hepatopathy mouse and a decay-accelerating factor (DAF/CD55) transgenic mouse is utilized as the immunodeficient hepatopathy mouse.
- 20 3. The method for proliferating human hepatocytes of claim 1 or 2, wherein the immunodeficient hepatopathy mouse is the progeniture mouse obtained by mating between a genetically immunodeficient mouse and a genetically hepatopathy mouse.
- 25 4. The method for proliferating human hepatocytes of claim 3, wherein the progeniture mouse is a hemizygous immunodeficient hepatopathy mouse.
- 30 5. The method for proliferating human hepatocytes of claim 4, wherein the hemizygous immunodeficient hepatopathy mouse is administered with a hepatocyte growth inhibitor and then the human hepatocytes are

transplanted therein.

6. The method for proliferating human hepatocytes of any one of claims 1 to 5, wherein the immunodeficient hepatopathy mouse transplanted
5 with the human hepatocytes is administered with an anti-mouse Fas antibody.

7. The method for proliferating human hepatocytes of claim 1, wherein the human hepatocytes to be transplanted into the immunodeficient hepatopathy mouse are proliferative human hepatocytes.

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8. The method for proliferating human hepatocytes of claim 7, wherein the proliferative human hepatocytes are human hepatocytes recognized by a monoclonal antibody which specifically recognizes human hepatocytes which proliferate with forming colony.

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9. The method for proliferating the human hepatocytes of claim 8, wherein the monoclonal antibody is one produced from Mouse-Mouse hybridoma K8223 (FERM BP-8334).

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10. A method for proliferating human hepatocytes in large scale, which comprises the following steps (1) to (3), and the steps (2) and (3) are repeated at least once;

(1) a step comprising transplanting human hepatocytes into a liver of an immunodeficient hepatopathy mouse, and then feeding the mouse
25 transplanted with human hepatocytes under such a condition as being protected from the attack by human complement produced by the human hepatocytes thereby proliferating the transplanted human hepatocytes in the mouse liver;

(2) a step isolating the proliferated human hepatocytes from the mouse
30 liver; and

(3) a step comprising transplanting the human hepatocytes isolated from the mouse liver into the liver of an immunodeficient hepatopathy mouse, and then feeding the mouse transplanted with the human hepatocytes for not shorter than 50 days under such a condition as being protected from the attack by human complement produced by the human hepatocytes.

11. The method for proliferating human hepatocytes in large scale of claim 10, wherein the condition of being protected from the attack by human complement in the step (1) and/or the step (3) is at least one of the following (a) and (b):

- (a) the mouse transplanted with human hepatocytes is administered at least once with a complement inhibitor;
- (b) a progeniture mouse obtained by mating between an immunodeficient hepatopathy mouse and a decay-accelerating factor (DAF/CD55) transgenic mouse is utilized as the immunodeficient hepatopathy mouse.

12. The method for proliferating human hepatocytes in large scale of claim 10 or 11, wherein the immunodeficient hepatopathy mouse in the step (1) and/or the step (3) is the progeniture mouse obtained by mating between a genetically immunodeficient mouse and a genetically hepatopathy mouse.

13. The method for proliferating human hepatocytes in large scale of claim 12, wherein the progeniture mouse is a hemizygous immunodeficient hepatopathy mouse.

14. The method for proliferating human hepatocytes in large scale of claim 13, wherein the hemizygous immunodeficient hepatopathy mouse is administered with a hepatocyte growth inhibitor and then human hepatocytes are transplanted therein.

15. The method for proliferating human hepatocytes in large scale of any one of claims 10 to 14, wherein the immunodeficient hepatopathy mouse transplanted with human hepatocytes in the step (1) and/or the step (3) is administered with an anti-mouse Fas antibody.

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16. The method for proliferating human hepatocytes in large scale of claim 10, wherein the human hepatocytes to be transplanted into the liver of the immunodeficient hepatopathy mouse in the step (1) and/or the step (3) are proliferative human hepatocytes.

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17. The method for proliferating human hepatocytes in large scale of claim 16, wherein the proliferative human hepatocytes are human hepatocytes recognized by a monoclonal antibody which specifically recognizes human hepatocytes which proliferate with forming colony.

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18. The method for proliferating human hepatocytes in large scale of claim 17, wherein the monoclonal antibody is one produced from Mouse-Mouse hybridoma K8223 (FERM BP-8334).

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19. The method for proliferating human hepatocytes in large scale of claim 10, wherein only human hepatocytes are substantially isolated in step (2) by at least one of the following procedures (a) and (b);

(a) to treat a liver tissue separated from the mouse liver with collagenase; and

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(b) to isolate cells being recognized by a monoclonal antibody which specifically recognizes human hepatocytes but not recognizes non-human hepatocytes.

20. The method for proliferating human hepatocytes in large scale of claim 19, wherein the monoclonal antibody is one produced by Mouse-Mouse

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hybridoma K8216 (FERM BP-8333).

21. A chimeric mouse carrying in the liver human hepatocytes proliferated by the method for proliferating human hepatocytes of any one of
5 claims 1 to 9, or by the method for proliferating human hepatocytes in large scale of any one of claims 10 to 20.

22. The chimeric mouse of claim 21, wherein the proliferated human hepatocytes make up not less than 70 % of the cells in the liver.

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23. The chimeric mouse of claims 21 or 22, wherein said mouse has human-type P450 activity.

24. A method for obtaining human hepatocytes comprises isolating
15 the human hepatocytes from the liver of the chimeric mouse of claims 21, 22 or 23.

25. The method for obtaining human hepatocytes of claim 24, wherein only human hepatocytes are substantially isolated by at least one of
20 the following procedures (a) and (b);

(a) to treat a liver tissue separated from the mouse liver with collagenase;
and
(b) to isolate cells being recognized by a monoclonal antibody which specifically recognizes human hepatocytes but not recognizes non-human
25 hepatocytes.

26. The method for obtaining human hepatocytes of claim 25, wherein the monoclonal antibody is one produced from Mouse-Mouse hybridoma K8216 (FERM BP-8333).

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27. Human hepatocytes obtained by the method of any one of claims 24 to 26.

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28. A cellular kit containing the human hepatocytes of claim 27.

29. A hybrid-type artificial liver filled with the human hepatocytes of claim 27.

10 30. A monoclonal antibody which specifically recognizes human hepatocytes but not recognize non-human hepatocytes.

31. The monoclonal antibody of claim 30, which is one produced from Mouse-Mouse hybridoma K8216 (FERM BP-8333).

15 32. Mouse-Mouse hybridoma K8216 (FERM BP-8333).

33. A method for testing pharmaceutical kinetics or toxicity of a candidate substance, which comprises systemically administering the substance into the chimeric mouse of claims 21, 22 or 23.

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